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Heart Failure and Cardiomyopathies

DIFFUSE MYOCARDIAL FIBROSIS IS GREATLY ELEVATED IN MALES WITH HEART FAILURE WITH REDUCED EJECTION FRACTION, BUT NOT HEART FAILURE WITH PRESERVED EJECTION FRACTION

Poster Contributions
Hall C
Monday, March 31, 2014, 9:45 a.m.-10:30 a.m.

Session Title: Heart Failure and Cardiomyopathies: Prognostic Factors and Determinants of Outcomes in Heart Failure Patients
Abstract Category: 12. Heart Failure and Cardiomyopathies: Clinical
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Background: Myocardial fibrosis has been implicated as a central component in the pathophysiology of heart failure with preserved ejection fraction. However, limited in vivo data exist regarding the degree of myocardial fibrosis in humans with HFpEF. Furthermore, no previous study has yet compared diffuse myocardial fibrosis in human HFpEF vs. HFrEF using cardiac MRI T1 measurements, a validated technique to assess myocardial fibrosis.

Methods: We prospectively studied male subjects without HF (n=30), with HFpEF (n=24) and HFrEF (n=10), without evidence of myocardial infarction on delayed enhancement imaging. We assessed diffuse myocardial fibrosis as the extracellular volume fraction (ECV) from pre- and post-gadolinium myocardial T1 measurements from Look-Locker sequences. The slope of the linear relationship between the myocardial R1 (LV wall) versus blood for the pre-Gd R1 measurement and several post-Gd time points provided an estimate of the partition coefficient for Gd, lambda, which was used to compute the extracellular volume fraction (ECV). We excluded subjects with evidence of myocardial infarctions by delayed enhancement imaging.

Results: Mean age was similar between the groups (P=0.21). In univariate analyses, HFrEF (β=9.3; P=0.001) but not HFpEF (β=3.1; P=0.15) was associated with a greater ECV. Mean ECV in subjects without HF, with HFpEF and HFrEF was 25.4, 28.5 and 34.8, respectively. In a multivariate model that adjusted for age, estimated glomerular filtration rate, diabetes mellitus, systolic blood pressure, LDL- and HDL-cholesterol, HFpEF was associated with an increase in ECV of 5.42 (95%CI=0.42 to 10.4; P=0.03), whereas HFrEF was associated with an increase in ECV of 10.8 (95%CI=5.0-16.6; P<0.001)

Conclusions: Although both HFpEF and HFrEF are associated with increased diffuse myocardial fibrosis relative to males without HF, those with HFrEF demonstrate a much greater increase than those with HFpEF. Our findings from a male population challenge the evolving view that HFpEF is associated with marked myocardial fibrosis. Fibrosis is however, a prominent feature of HFrEF even in the absence of myocardial infarction.